# Configuring BSC Transport Services

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Bay Networks *Where Information Flows.*™

Bay Networks Where Information Flows.

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# Preface

This guide describes how to configure router software to transport binary synchronous communication (BSC) data over a multiprotocol backbone network.

## Before You Begin

If you configure and manage BSC Transport Services (BTS) for Bay Networks® routers, you need to read this guide. Before using this guide, you must complete the following procedures. For a new router:

- Install the router (refer to the installation manual that came with your router).
- Connect the router to the network and create a pilot configuration file (refer to *Quick-Starting Routers*; *Configuring BayStack Remote Access*, or *Connecting ASN Routers to a Network)*.

Make sure you are running the latest version of Bay Networks Site Manager and router software. For instructions, refer to the upgrade guide.

# Text Conventions

This guide uses the following text conventions:

| | |
|---|---|
| angle brackets (< >) | Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command.<br>Example: If the command syntax is:<br><br>**ping** *<ip_address>*, you enter:<br>**ping 192.32.10.12** |
| **bold text** | Indicates text that you need to enter and command names and options.<br>Example: Enter **show ip** {**alerts** \| **routes**}<br><br>Example: Use the **dinfo** command. |
| *italic text* | Indicates file and directory names, new terms, book titles, and variables in command syntax descriptions. Where a variable is two or more words, the words are connected by an underscore.<br>Example: If the command syntax is:<br><br>**show at** *<valid_route>*<br>*valid_route* is one variable and you substitute one value for it. |
| `screen text` | Indicates system output, for example, prompts and system messages.<br>Example: `Set Bay Networks Trap Monitor Filters` |
| separator ( > ) | Shows menu paths.<br>Example: Protocols > IP identifies the IP option on the Protocols menu. |
| vertical line ( \| ) | Separates choices for command keywords and arguments. Enter only one of the choices. Do not type the vertical line when entering the command.<br>Example: If the command syntax is:<br><br>**show ip** {**alerts** \| **routes**}, you enter either:<br>**show ip alerts** or **show ip routes**, but not both. |

## Acronyms

| | |
|---|---|
| ASCII | American Standard Code for Information Interchange |
| Bisync | binary synchronous communication |
| BOT | binary synchronous communication (BSC) over TCP/IP; Bisync over TCP |
| BSC | binary synchronous communication |
| BTS | BSC Transport Services |
| CTS | clear to send |
| CU | control unit |
| EBCDIC | extended binary coded decimal interchange code |
| FEP | front-end processor |
| FTP | File Transfer Protocol |
| ISDN BRI | Integrated Services Digital Network Basic Rate Interface |
| MTU | maximum transmission unit |
| RTS | request to send |
| TCP | Transmission Control Protocol |

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800-2LANWAN

# Chapter 1
# Starting BSC Transport Services

The quickest way to begin using BTS is to enable it with default values for all Bisync over TCP (BOT) interfaces and peers. The sections that follow describe this procedure.

If you want to modify BOT parameters, refer to Chapter 4. See Appendix B for complete descriptions of the BOT parameters as they appear in Site Manager.

## Preparing a Configuration File

To enable BTS, read *Configuring and Managing Routers with Site Manager* and

1. Open a configuration file.
2. Specify router hardware if this is a local-mode configuration file. Bay Networks supports BTS on AN®, ASN™, ARN™, and BN® platforms.
3. Choose a link module. For ASN routers, select the Dual Sync or the Dual Sync/ISDN BRI net module. For BN routers, select the Octal Sync module. For ARN routers, select the Serial adapter module or any of the following expansion modules: TRI Serial, Ethernet/TRI Serial, Token Ring/TRI Serial, or Token Ring/TRI Serial/DCM.
4. Selected the module connector on which you want to use BTS. You can enable BTS only on connectors labeled COM1 and COM2. On the Octal Sync module, select any COM connector.

Refer to *Configuring and Managing Routers with Site Manager* for instructions on these procedures.

## Starting BTS

To start BTS on an interface, select the synchronous connector on which you are enabling BTS, and then follow the path described in this box:

**Site Manager Path:** From the WAN Protocols window that appears after you select the connector, **select BOT**. Click on OK. The BOT Interfaces window appears. Click on OK to accept the default values, or edit the following parameters to customize the configuration (refer to Appendix B), and then click on OK.

Enable: page B-1
Interface Attached To: page B-2
Interface Type: page B-2
TCP Keepalive Int: page B-3
TCP Keepalive Retry Timeout: page B-3
TCP Keepalive Retry Count: page B-4

## Deleting BTS from the Platform

To delete BTS from *all* circuits on which it is currently configured, follow this path:

**Site Manager Path:** Configuration Manager > Protocols > BOT > Delete BOT. A window prompts: `Do you REALLY want to delete BOT?` Click on OK. Site Manager returns you to the Configuration Manager window. BTS interfaces are no longer operating on the platform.

# Chapter 2
# BSC Transport Services Overview

BTS transmits binary synchronous communication (BSC) data over a multiprotocol backbone network. A BTS configuration on the router executes the protocol application Bisync over TCP (BOT). BTS operates on the Bay Networks AN, ARN, ASN, and BN routers running Software Version 11.01 or later.

In the 1960s, IBM introduced the BSC protocol to transmit data between mainframes and remote devices. Since then, IBM and many other vendors have been using the BSC protocol with many types of computers and devices. BTS users of BSC equipment can improve their networks by

- Integrating BSC devices into an existing network of newer client/server services
- Eliminating direct BSC lines, which are expensive and often underused
- Ensuring an extremely reliable and resilient method of data transmission via TCP/IP

## BSC Protocol

BSC typically operates over low-speed lines up to 19.2 Kb/s. The BSC protocol is character-oriented and assumes 8-bit characters. It uses EBCDIC or, less commonly, ASCII and other code sets for data transmission.

There are two main versions of the BSC protocol:

- BSC3, Interactive (BSC 3270)

  Its primary-secondary architecture specifies that the primary device is responsible for initiating connections and controlling the transmission data.

- BSC1, Batch (BSC 2780/3780)

  It permits either side to initiate the connection and transfer data.

Bay Networks currently supports the BSC3 protocol.

## Hosts and Control Units

A BSC *host* is typically a mainframe computer running the BSC protocol. BSC devices communicate with hosts via *control units*. A control unit (CU) manages the BSC devices that connect to it.

## Transmitting BSC Frames over TCP

Data travels from one BSC device to another using two routers: a *primary* router and a *secondary* router (Figure 2-1). A primary router has an interface to the host, and a secondary router has an interface to the control units. Because you can configure a single router interface as either primary or secondary, a router with multiple interfaces can support both primary and secondary operations.

Figure 2-1 illustrates how a BSC device uses BTS to transmit data to a BSC host.

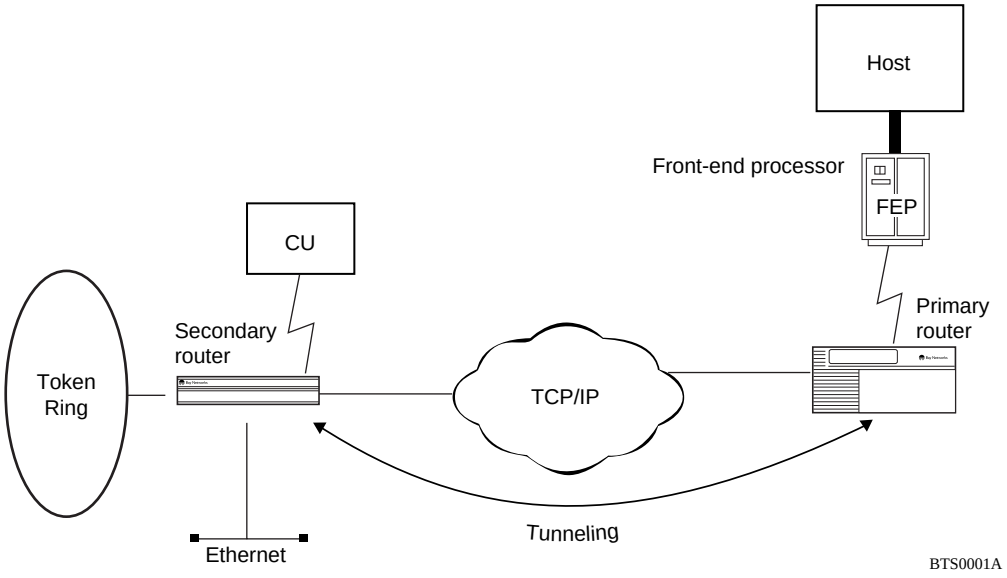


**Figure 2-1. Tunneling of BSC Frames**

BSC data travels between two routers using a process called *tunneling*. Tunneling is independent of protocol differences between BSC devices and hosts.

The transfer process works like this:

1. A primary router interface transmits data to a secondary router interface.
2. The secondary router encapsulates the BSC data in a TCP/IP packet.
3. The secondary router transmits the packet over the IP network to the primary router.
4. The primary router extracts the BSC data from the TCP/IP packet.
5. The primary router transmits the BSC data to the BSC host via a front-end processor (FEP).

# Point-to-Point and Multipoint Configurations

You can use BTS with point-to-point, multipoint, and virtual multipoint configurations.

## Point-to-Point Configuration

In a BTS point-to-point configuration, one control unit and one host connect via one pair of routers (Figure 2-2).

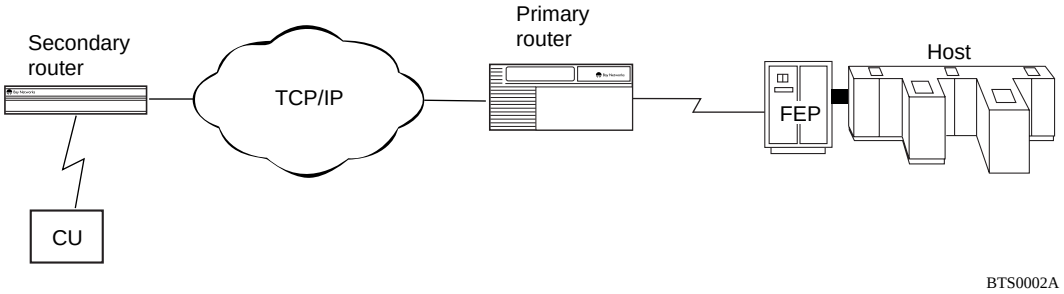


**Figure 2-2. BTS Point-to-Point Configuration**

## Multipoint Configuration

In a BTS multipoint configuration, up to 32 control units on the same line connect to one host via one pair of routers (Figure 2-3).

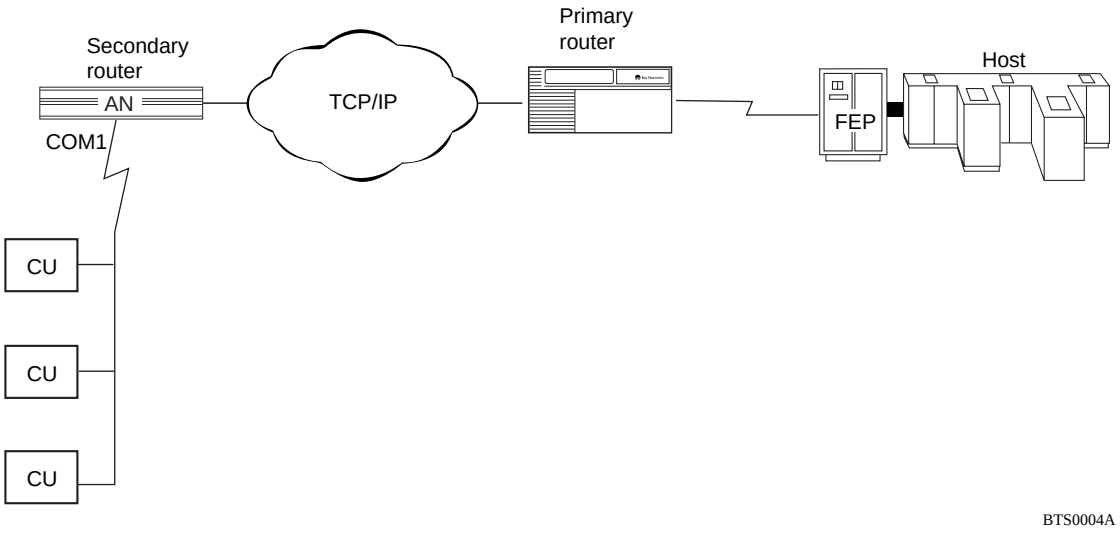


**Figure 2-3. BTS Multipoint Configuration**

## Virtual Multipoint Configuration

In a virtual BTS multipoint configuration, control units connect to secondary routers, which link to the host via the primary router (Figure 2-4). Up to 32 control units can connect to the synchronous ports on each secondary router. Using a virtual multipoint configuration, control units at different sites can communicate with the host via the same line.

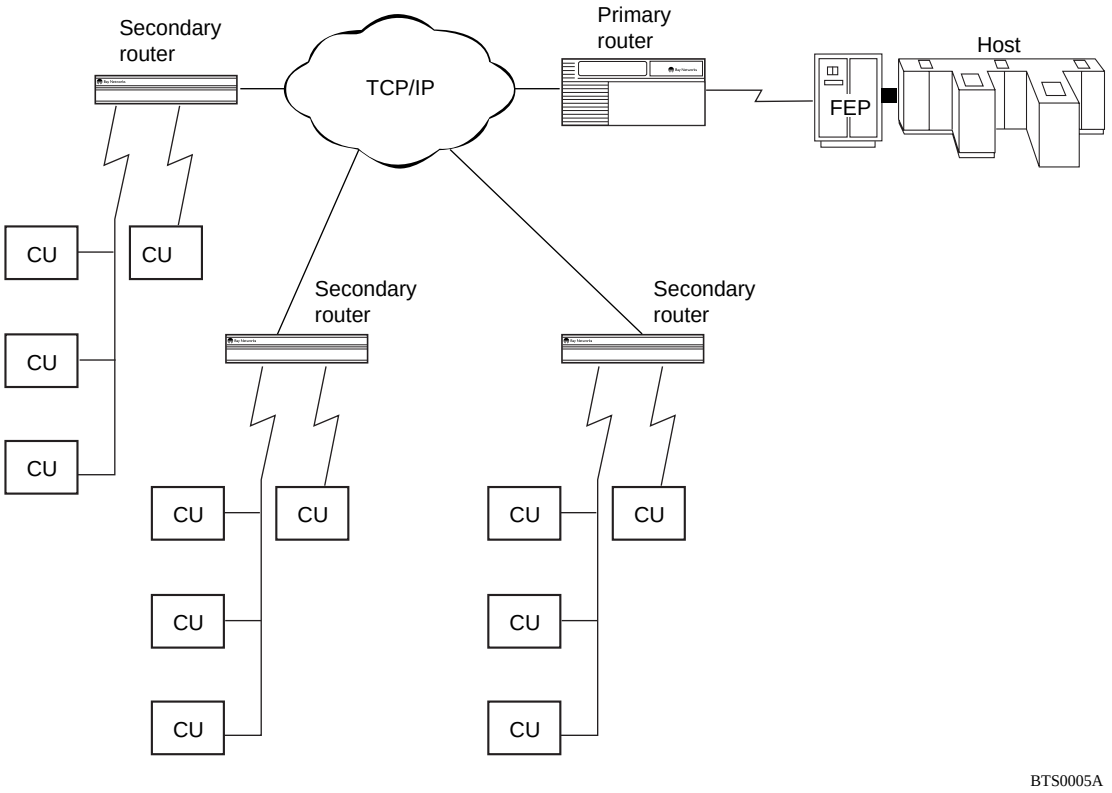


**Figure 2-4. BTS Virtual Multipoint Configuration**

# Chapter 3
# Implementation Notes

This chapter describes basic guidelines for implementing BTS on your network.

## BTS Interfaces

You can enable the BOT application only on COM1 or COM2 interfaces on AN routers. For ASN routers, select COM1 or COM2 on the Dual Sync module or the Dual Sync/ISDN BRI module. For ARN routers, select the Serial adapter module. For BN routers, select up to eight COM ports on the Octal Sync module.

When you enable BOT on an interface, you must specify whether the interface

- Connects to a host (primary connection) or a control unit (secondary connection)
- Makes one (point-to-point) or many (multipoint) TCP connections

  Only a primary interface can have multiple TCP connections.

Refer to Chapter 1 for information about starting BTS.

## Peer Routers

When you enable BOT, you must assign at least one peer router. If you set up a point-to-point BOT interface, you can assign only one peer router. If, however, you set up a multipoint BOT interface, you can assign multiple peer routers, either when you enable BOT or later.

When you assign a peer router, you must specify

- The IP address of the peer router
- Which of the two routers initiates the TCP connection
- The TCP ports the routers use for BOT

**Caution:** Do not specify a TCP port that you have assigned to another application.

You must also configure the peer router so that the information for the router pair matches. Refer to Chapter 4 for information about assigning peer routers.

## Connections to Control Units

You can connect up to 32 control units on the same line that links to a secondary router. The actual performance on the line directly relates to the number of control units you connect.

In a multipoint or virtual multipoint configuration, you must configure the BOT CU table on the primary router. This table contains the addresses of each control unit the host can access.

You cannot configure the BOT CU table if the interface

- Connects to a control unit
- Makes a point-to-point connection

For a virtual multipoint configuration, the primary router can have more than one peer router. For each peer router, you must specify the control units that the host can access.

## Line Details

Configuring line details for a bisynchronous line is similar to configuring line details for a synchronous line. You need to specify the following information:

- Maximum frame size the router can transmit on this line
- Clock source for the timing signals
- Speed of the clock source
- Queue lengths for transmitting and receiving data
- Control character mode (EBCDIC or ASCII)

Refer to Chapter 4 for information about configuring line details.

# Chapter 4
# Configuring BTS

When you enable BTS, default values are in effect for all parameters (see Appendix C). You can change these values to suit your network requirements. The following sections describe your options.

**Note:** To edit BTS parameters, first configure at least one synchronous interface (COM#) on an AN, ASN,ARN, or BN router. For ASN routers, make sure you are using the Dual Sync or the Dual Sync/ISDN BRI network module. For BN routers, use the Octal Sync module. For ARN routers, use the Serial adapter module. To initially configure an interface, or to add additional synchronous interfaces, see *Configuring and Managing Routers with Site Manager.*

## Using the MIB Object ID

The Technician Interface allows you to modify parameters by issuing **set** and **commit** commands with the MIB object ID. This process is equivalent to modifying parameters using Site Manager. For more information about using the Technician Interface to access the MIB, refer to *Using Technician Interface Software*.

**Caution:** The Technician Interface does not verify that the value you enter for a parameter is valid. Entering an invalid value can corrupt your configuration.

# Accessing BTS Parameters

In Site Manager, either of these paths leads you to the BTS parameters:

**Site Manager Path 1**: Configuration Manager > Protocols > BOT

**Site Manager Path 2**: Select a synchronous port that you have configured for BTS. The Edit Connector window appears. Select **Edit Circuit**. The Circuit Definition window appears. Use the BTS Circuit menu to access BTS parameters.

BTS parameters fall into the following categories:

- Global (Enable and Disable)
- Interface
- Peer
- Control Unit
- Line

# Globally Enabling and Disabling BTS

You can globally enable or disable the system software mechanisms that use the BTS interface on a synchronous circuit.

The Disable option switches every BTS interface on the router into an inactive state. The Enable option reinitializes every BTS interface on the router, with each interface maintaining the most recent settings. The actual operating state of each interface further depends on the current up/down state of the associated physical circuit. To globally enable or disable BTS, follow this path:

**Site Manager Path**: Configuration Manager > Protocols > BOT > Global. The Edit BOT Global Parameters window appears. Click on Values. Select **Enable | Disable.** Click on OK.

Enable parameter: page B-1

# Customizing BTS Interfaces

You can edit the following BTS settings on individual interfaces:

- Enabling and disabling BTS interfaces
- Attaching interfaces to primary and secondary connections
- Selecting an interface type
- Setting the TCP keepalive parameters
- Deleting a BTS interface

To edit BTS interfaces, follow this path:

**Site Manager Path:** Configuration Manager > Protocols > BOT > Interfaces. The BOT Interface window appears.

## Enabling and Disabling BTS Interfaces

The Enable parameter allows you to enable or disable BTS on an interface. The default setting is Enable. To enable or disable BTS interfaces, follow Path 1 or Path 2.

**Site Manager Path 1:** Configuration Manager > Protocols > BOT > Interfaces. The BOT Interface window appears. Select the interface to edit from the upper left window. Click on Values. Select **Enable | Disable.**

Enable parameter: page B-1

**Site Manager Path 2:** Select a port that you have configured for BTS. The Edit Connector window appears. Select **Edit Circuit**. The Circuit Definition window appears. Select Protocols or Group Protocols > Edit BOT > Interface. The Edit BOT Interface window appears. Click on Values. Select **Enable | Disable.**

Enable parameter: page B-1

## Creating Primary and Secondary Connections

The Interface Attached To parameter specifies whether this interface connects to a host (primary connection) or a control unit (secondary connection). Specify either Primary or Secondary. The router does not provide a default for this setting.

| Site Manager: Interface Attached To: page B-2 |
|---|

## Selecting an Interface Type

The Interface Type parameter specifies whether the interface has one or many TCP connections. Point-to-point provides one TCP connection to the peer router. Multipoint provides many TCP connections to one or more peer routers. A multipoint connection can also be one TCP connection with multiple CUs. A primary interface can have either a point-to-point or multipoint connection. A secondary interface can have only a point-to-point connection.

Specify either Point-to-Point or Multipoint. The default setting is Point-to-Point.

| Site Manager: Interface Type: page B-2 |
|---|

## Setting the TCP Keepalive Parameters

The TCP Keepalive Interval parameter specifies how often the router sends a signal to the peer router to check that the peer router is working correctly and can receive messages. You enable the parameter by specifying a nonzero value.

When a keepalive packet goes unacknowledged by the remote peer, retransmission begins at the local peer router. You should tune the keepalive interval based on the total time it takes to send and receive acknowledgment from the remote peer.

Since keepalive packets are only sent on idle lines, increasing the keepalive interval may decrease the cost of an idle network. In busy networks, the keepalive interval is not necessary. Frequent traffic for TCP transmission performs the same function as a keepalive setting.

Enter a value appropriate for the network in the range 0 to 86400 seconds. We recommend that you set this parameter to the same value on the peer router to maintain synchronization. The default setting is 120 seconds.

| Site Manager: TCP Keepalive Int (sec): page B-3 |
|---|

The TCP Keepalive Retry Timeout parameter specifies the maximum time between successive retransmissions of keepalive packets. If an acknowledgment is not received by the local peer router within the TCP keepalive retry timeout, the local peer router retransmits the keepalive packet. The router continues to retransmit keepalive packets at every TCP keepalive retry timeout until it receives an acknowledgment from the remote peer, or until TCP reaches the keepalive retry count setting.

Enter a value in the range 0 to 600 seconds. The default setting for the TCP Keepalive Retry timeout is 4 seconds.

| Site Manager: TCP Keepalive Retry Timeout (sec): page B-3 |
|---|

TCP determines a lost connection (either a failed link with no rerouting possible, or the remote router is unavailable) when TCP attempts to deliver data. If TCP does not receive an acknowledgment to transmitted keepalive packets after a series of retries, it declares the connection inoperable and informs BTS. The *TCP* Keepalive Retry Count is the number of times TCP attempts to establish or maintain a connection.

Enter a value in the range 0 to 99. The default setting is 5 attempts.

| Site Manager: TCP Keepalive Retry Count (sec): page B-4 |
|---|

### Deleting a BTS Interface

To delete a BTS interface from its associated physical circuit, follow this path:

**Site Manager Path:** At the Configuration Manager window, select Circuits > Delete Circuit. The Circuit List window appears. Select the interface to delete from the upper left window. Click on Delete. The Delete Circuit window appears. Click on Delete.

**Note:** Whenever you delete a BOT interface, the router will continue to run TCP if other applications on the router require TCP services.

## Assigning Peer Routers

When you enable BTS on a router, you must assign at least one peer router. If you set up a point-to-point BTS interface, you can assign only one peer router. If, however, you set up a multipoint BTS interface, you can assign multiple peer routers, either when you enable BTS or later. To assign a peer router, follow this path:

**Site Manager Path:** Configuration Manager > Protocols > BOT > Interfaces. Select **Peer Table**. The BOT Peer Table Configuration window appears. Click on Add. The Add BOT Peer Entry window appears.

Configure the parameters in the window. Click on OK. The BOT Peer Table Configuration window reappears with the peer entry that you just added.

When you configure a peer router, the software automatically enables the TCP connection to that router. To later disable a connection to a peer router, refer to "Enabling and Disabling BTS Peer Connections," later in this section.

### Specifying the Peer IP Address

The Peer IP Address parameter allows you to specify the IP address of a peer router. Use any valid IP address in dotted decimal notation.

Site Manager: Peer IP Address parameter: page B-4

## Selecting the Connection Originator

When you configure a connection, you need to decide which router initiates the TCP connection, either the local peer router or the remote peer router. If the local peer router is the TCP connection initiator, then you configure it as Self and you configure the remote peer as Partner.

The Connection Originator parameter setting controls whether the local router (Self) or the remote peer router (Partner) initiates the TCP connection. Select Self or Partner. Be sure to set this parameter on the peer router to the other value. There is no default setting.

Site Manager: Connection Originator parameter: page B-5

## Setting the TCP Listen Ports

The Local TCP Listen Port parameter specifies the TCP port number that this router uses to establish a TCP connection. This parameter is active only when you set the Connection Originator parameter to Partner.

Enter a valid, available port number for this router in the range 1000 to 9999. Be sure to use the same value for the Peer TCP Listen Port parameter on the peer router.

Site Manager: Local TCP Listen Port parameter: page B-5

The Peer TCP Listen Port parameter specifies the TCP port that the peer router uses to establish a TCP connection. This parameter is active only when you set the connection originator parameter to Self.

Enter an available port number for the peer router in the range 1000 to 9999. Be sure to use the same value for the Local TCP Listen Port parameter on the peer router.

Site Manager: Peer TCP Listen Port parameter: page B-5

## Enabling and Disabling BTS Peer Connections

When you configure a peer router, the local router automatically enables the TCP connection to the peer. To disable and reenable the connection to a peer router, follow this path:

**Site Manager Path:** Configuration Manager > Protocols > BOT > Interfaces. Click on **Peer Table**. The BOT Peer Table Configuration window appears.

Select a peer connection from the list window. Click on Values. Select **Enable | Disable.** Click on Apply.

Enable parameter: page B-4.

# Creating Connections to Control Units

In a multipoint or virtual multipoint configuration, you must configure the BOT CU Table on the primary router. This table contains the addresses of each control unit that the host can access.

You cannot configure the BOT CU Table if the interface

- Connects to a control unit
- Makes a point-to-point connection

In a virtual multipoint configuration, the primary router can have more than one peer router. Each peer router has a corresponding entry in the BOT Peer Table. For each entry, you must specify the control units that the host can access. To access the CU Table, follow this path:

**Site Manager Path:** Configuration Manager > Protocols > BOT > Interfaces. Click on **Peer Table**. The BOT Peer Table Configuration window appears.

Select a peer connection from the list window. Click on **CU Table**. The BOT CU Table Configuration window appears.

Click on **Add**. The Add BOT CU Entry window appears.

## Entering the Control Unit Address

The control unit address is a hexadecimal value in the range 0x40 to 0xFE. Refer to Appendix A for guidelines.

Site Manager: Control Unit Address (hex) parameter: page B-6

When you add an entry to the BOT CU Table, the software automatically enables the TCP connection to that control unit. To disable the connection later, refer to the next section, "Enabling and Disabling a Connection to a Control Unit."

## Enabling and Disabling a Connection to a Control Unit

You can disable or reenable the connection to a control unit with the Enable parameter. If you disable the connection to the control unit, the TCP connection remains active, but unused until you reenable the connection. The default setting is Enable. To access this parameter, follow this path:

**Site Manager Path:** Configuration Manager > Protocols > BOT > Interfaces. Click on **Peer Table**. The BOT Peer Table Configuration window appears.

Select a peer connection from the list window. Click on **CU Table**. The BOT CU Table Configuration window appears. Select a control unit from the list of entries. Select the Enable parameter. Click on Values. Select **Enable | Disable.**

Click on Apply. Click on Done.

Enable parameter: page B-4.

# Editing Line Parameters

This section describes the parameters you can modify for each BTS line. The parameters are

- Enable
- MTU (maximum transmission unit) size
- Clock source and clock speed
- Configured transmit and receive queue length
- Control character mode
- Request to send (RTS) enable
- External clock speed

To edit the line parameters, follow this path:

**Site Manager Path:** Select a port that you have configured for BTS. The Edit Connector window appears. Select **Edit Line**. The Edit BISYNC Parameters window appears. Edit the line parameters. Click on OK to save the changes.

## Enabling the Line

The Enable parameter enables and disables the line on which you have BTS running. The default setting is Enable.

Site Manager: Enable parameter: page B-6

## Setting the Transmission Frame Size

The MTU Size parameter specifies the largest frame that the router can transmit across this bisynchronous line. Enter a value in the range 1 to 4568. The default setting is 1580.

Site Manager: MTU Size parameter: page B-7

## Adjusting the Bisynchronous Timing Signals

The Clock Source parameter specifies the origin of the bisynchronous timing signals. If you set this parameter to Internal, this router supplies the required timing signals. If you set this parameter to External, an external network device supplies the required timing signals. The default setting is External.

Select the clocking mode, as appropriate for the network. Be sure to attach the appropriate cable to your router for either an internal or external clocking source (see the *Cable Guide* for information).

Site Manager: Clock Source parameter: page B-7

The Clock Speed parameter sets the clock speed when you use the router to supply clocking signals. The allowable settings are: 1200, 2400, 4800, 7200, 9600, and 19200. The default setting is 9600.

Set the Clock Speed parameter to the desired data transmission rate across the bisynchronous line, and set the Clock Source parameter to Internal.

Site Manager: Clock Speed parameter: page B-8

The External Clock Speed parameter sets the clock speed when you use an external source to supply clocking signals.

Enter the value in the range 1200 to 19200 bits/sec that most closely corresponds to the speed of the external clock, and set the Clock Source parameter to external. The default setting is 9600.

Site Manager: External Clock Speed parameter: page B-9

## Adjusting the Transmission Queues

The Configured Transmit Queue Length parameter specifies the length of the transmit queue. If you set this parameter to 0, the router selects an appropriate value; otherwise, the router uses the length you specify. If you enter a value that is larger than the number of buffers the router reserves for transmitting data, the router reduces the value to a usable size.

Accept the default value (0) or enter a value in the range 0 to 255 that is appropriate for this line.

Site Manager: Configured Transmit Q Length parameter: page B-8

The Configured Receive Queue Length parameter specifies the length of the receive queue. If you set this parameter to 0, the router selects an appropriate value; otherwise, the router uses the length you specify. If you enter a value that is larger than the number of buffers the router reserves for receiving data (the compiled ring size), the router reduces the value to the compiled ring size.

Accept the default value (0) or enter a value in the range 0 to 255 that is appropriate for this line.

Site Manager: Configured Receive Q Length parameter: page B-8

## Setting the Control Character Mode

The Control Character Mode parameter specifies the code set that the BSC protocol uses. The bisynchronous link layers use control characters to identify frames. EBCDIC is more common than ASCII.

Select EBCDIC or ASCII. The default setting is EBCDIC.

Site Manager: Control Character Mode parameter: page B-9

## Enabling and Disabling RTS and CTS Signal Detection

The RTS Enable parameter enables or disables the detection of request-to-send (RTS) and clear-to-send (CTS) signals on this interface. Set this parameter to enable if the connected device (for example, a modem) uses RTS/CTS flow control. The default setting is Disable.

Site Manager: RTS Enable parameter: page B-9

# Appendix A
# Control Unit Addresses

To specify a connection to a control unit, you enter the control unit's address. Table A-1 shows the addresses to use for BSC3.

**Table A-1. Device Address Table for BSC3**

| Control Unit or Device Position | Control Unit Address |
|---|---|
| 0 | 0x40 |
| 1 | 0xC1 |
| 2 | 0xC2 |
| 3 | 0xC3 |
| 4 | 0xC4 |
| 5 | 0xC5 |
| 6 | 0xC6 |
| 7 | 0xC7 |
| 8 | 0xC8 |
| 9 | 0xC9 |
| 10 | 0x4A |
| 11 | 0x4B |
| 12 | 0x4C |
| 13 | 0x4D |
| 14 | 0x4E |
| 15 | 0x4F |
| 16 | 0x50 |

*(continued)*

**Table A-1. Device Address Table for BSC3** *(continued)*

| Control Unit or Device Position | Control Unit Address |
|---|---|
| 17 | 0xD1 |
| 18 | 0xD2 |
| 19 | 0xD3 |
| 20 | 0xD4 |
| 21 | 0xD5 |
| 22 | 0xD6 |
| 23 | 0xD7 |
| 24 | 0xD8 |
| 25 | 0xD9 |
| 26 | 0x5A |
| 27 | 0x5B |
| 28 | 0x5C |
| 29 | 0x5D |
| 30 | 0x5E |
| 31 | 0x5F |

# Appendix B
# BTS Parameters

## BTS Global Parameters

| | |
|---|---|
| **Parameter:** | **Enable** |
| Path: | Configuration Manager > Protocols > BOT > Global |
| Default: | Enable |
| Options: | Enable \| Disable |
| Function: | Enables or disables BOT on this interface. |
| Instructions: | Select Enable or Disable. |
| MIB Object ID: | 1.3.6.1.4.1.18.3.5.18.1.2 |

## BTS Interface Parameters

| | |
|---|---|
| **Parameter:** | **Enable** |
| Path: | Configuration Manager > Protocols > BOT > Interfaces |
| Default: | Enable |
| Options: | Enable \| Disable |
| Function: | Enables or disables BOT on this interface. |
| Instructions: | Select Enable or Disable. |
| MIB Object ID: | 1.3.6.1.4.1.18.3.5.18.2.1.2 |

**Parameter: Interface Attached To**

| | |
|---|---|
| Path: | Configuration Manager > Protocols > BOT > Interfaces |
| Default: | None |
| Options: | Primary \| Secondary |
| Function: | Specifies whether this interface connects to a host (primary connection) or a control unit (secondary connection). |
| Instructions: | Select Primary or Secondary. |
| MIB Object ID: | 1.3.6.1.4.1.18.3.5.18.2.1.7 |

**Parameter: Interface Type**

| | |
|---|---|
| Path: | Configuration Manager > Protocols > BOT > Interfaces |
| Default: | Point-to-Point |
| Options: | Point-to-Point \| Multipoint |
| Function: | Specifies whether the interface has one or many TCP connections. Point-to-point provides one TCP connection to the peer router. Multipoint provides many TCP connections to one or more peer routers. A multipoint connection can also be one TCP connection with multiple CUs. A primary interface can have either a point-to-point or multipoint connection. A secondary interface can have only a point-to-point connection. |
| Instructions: | If this is a primary connection, select point-to-point or multipoint; if this is a secondary connection, accept point-to-point. |
| MIB Object ID: | 1.3.6.1.4.1.18.3.5.18.2.1.6 |

**Parameter: TCP Keepalive Int (sec)**

Path: Configuration Manager > Protocols > BOT > Interfaces

Default: 120

Options: 0 to 86400 seconds

Function: Specifies how often the router sends a signal to the peer router to check that the peer router is working correctly and can receive messages.

When a keepalive packet goes unacknowledged by the remote peer, retransmission begins at the local peer router. You should tune the keepalive interval based on the total time it takes to send and receive acknowledgment from the remote peer.

Since keepalive packets are only sent on idle lines, increasing the keepalive interval may decrease the cost of an idle network. In busy networks, the keepalive interval is not necessary. Frequent traffic for TCP transmission performs the same function as a keepalive setting.

Instructions: Enter a value appropriate for the network. We recommend that you set this parameter to the same value on the peer router to maintain synchronization.

MIB Object ID: 1.3.6.1.4.1.18.3.5.18.2.1.9

**Parameter: TCP Keepalive Retry Timeout (sec)**

Path: Configuration Manager > Protocols > BOT > Interfaces

Default: 4

Options: 0 to 600 seconds

Function: Specifies the maximum time between successive retransmissions of keepalive packets. If an acknowledgment is not received by the local peer router within the TCP keepalive retry timeout, the local peer router retransmits the keepalive packet. The router continues to retransmit keepalive packets at every TCP keepalive retry timeout until it receives an acknowledgment from the remote peer, or until TCP reaches the keepalive retry count setting.

Instructions: Enter a value in the range 0 to 600.

MIB Object ID: 1.3.6.1.4.1.18.3.5.18.2.1.10

**Parameter: TCP Keepalive Retry Count**

Path: Configuration Manager > Protocols > BOT > Interfaces
Default: 5
Options: 0 to 99 seconds
Function: Specifies the number of TCP attempts to establish or maintain a connection. If TCP does not receive an acknowledgment after a series of retries, it declares the connection inoperable and informs BOT.
Instructions: Enter a value in the range 0 to 99 seconds.
MIB Object ID: 1.3.6.1.4.1.18.3.5.18.2.1.11

## BTS Peer Table Parameters

**Parameter: Enable**

Path: Configuration Manager > Protocols > BOT > Interfaces > **Peer Table**
Default: Enable
Options: Enable | Disable
Function: Enables or disables the TCP connection to this peer router interface.
Instructions: Select Enable or Disable.
MIB Object ID: 1.3.6.1.4.1.18.3.5.18.3.1.2

**Parameter: Peer IP Address**

Path: Configuration Manager > Protocols > BOT > Interfaces > **Peer Table** > **Add**
Default: None
Options: Any valid IP address
Function: Specifies the IP address of the peer router.
Instructions: Enter the peer router's IP address in dotted decimal notation.
MIB Object ID: 1.3.6.1.4.1.18.3.5.18.3.1.5

**Parameter: Connection Originator**

Path: Configuration Manager > Protocols > BOT > Interfaces > **Peer Table** > **Add**
Default: None
Options: Self | Partner
Function: Determines whether this router (Self) or the peer router (Partner) initiates the TCP connection.
Instructions: Select Self or Partner. Be sure to set this parameter on the peer router to the other value.
MIB Object ID: 1.3.6.1.4.1.18.3.5.18.3.1.6

**Parameter: Local TCP Listen Port**

Path: Configuration Manager > Protocols > BOT > Interfaces > **Peer Table** > **Add**
Default: None
Options: 1000 to 9999
Function: Specifies the TCP port number that this router uses to establish a TCP connection. This parameter is active only when you set the Connection Originator parameter to Partner.
Instructions: Enter a valid, available port number for this router. Be sure to use the same value for the Peer TCP Listen Port parameter on the peer router.
MIB Object ID: 1.3.6.1.4.1.18.3.5.18.3.1.7

**Parameter: Peer TCP Listen Port**

Path: Configuration Manager > Protocols > BOT > Interfaces > **Peer Table** > **Add**
Default: None
Options: 1000 to 9999
Function: Specifies the TCP port that the peer router uses to establish a TCP connection. This parameter is active only when you set the Connection Originator parameter to Self.
Instructions: Enter a valid, available port number for the peer router. Be sure to use the same value for the Local TCP Listen Port parameter on the peer router.
MIB Object ID: 1.3.6.1.4.1.18.3.5.18.3.1.8

# BOT CU Table Parameters

**Parameter:** **Control Unit Address**

Path: Configuration Manager > Protocols > BOT > Interfaces > **Peer Table** > **CU Table** > **Add**

Default: None

Options: 0x40 to 0xFE

Function: Specifies the address of the control unit.

Instructions: Enter the address of the control unit, in hexadecimal format.

MIB Object ID: 1.3.6.1.4.1.18.3.5.18.3.1.8

**Parameter:** **Enable**

Path: Configuration Manager > Protocols > BOT > Interfaces > **Peer Table** > **CU Table**

Default: Enable

Options: Enable | Disable

Function: Enables or disables this control unit.

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.5.18.4.1.2

# Line Parameters

**Parameter:** **Enable**

Path: Configuration Manager > Select connector > **Edit Line**

Default: Enable

Options: Enable | Disable

Function: Enables or disables this line.

Instructions: Select Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.27.1.1.2

**Parameter:** **MTU Size**

Path: Configuration Manager > Select connector > **Edit Line**

Default: 1580

Options: 1 to 4568 bytes

Function: Specifies the largest frame that the router can transmit across this bisynchronous line.

Instructions: Specify a value appropriate for the network.

MIB Object ID: 1.3.6.1.4.1.18.3.4.27.1.1.4

**Parameter:** **Clock Source**

Path: Configuration Manager > Select connector > **Edit Line**

Default: External

Options: External | Internal

Function: Specifies the origin of the bisynchronous timing signals. If you set this parameter to Internal, the router supplies the required timing signals. If you set this parameter to External, an external network device supplies the required timing signals.

Instructions: Select the clocking mode, as appropriate for the network. Be sure to attach the appropriate cable to your router for an internal or external clocking source (see the cable guide for information).

MIB Object ID: 1.3.6.1.4.1.18.3.4.27.1.1.7

**Parameter: Clock Speed**

Path: Configuration Manager > Select connector > **Edit Line**

Default: 9600

Options: 1200 B | 2400 B | 4800 B | 7200 B | 9600 B | 19200 B

Function: Sets the clock speed when you use the router to supply clocking signals.

Instructions: Set the Clock Speed parameter to the desired data transmission rate across the bisynchronous line, and set the Clock Source parameter to Internal.

MIB Object ID: 1.3.6.1.4.1.18.3.4.27.1.1.8

**Parameter: Configured Transmit Q Length**

Path: Configuration Manager > Select connector > **Edit Line**

Default: 0

Options: 0 to 255

Function: Specifies the length of the transmit queue. If you set this parameter to 0, the router selects an appropriate value; otherwise, the router uses the length you specify. If you enter a value that is larger than the number of buffers the router reserves for transmitting data (the compiled ring size), the router reduces the value to the compiled ring size.

Instructions: Accept the default or enter a value that is appropriate for this line.

MIB Object ID: 1.3.6.1.4.1.18.3.4.27.1.1.10

**Parameter: Configured Receive Q Length**

Path: Configuration Manager > Select connector > **Edit Line**

Default: 0

Options: 0 to 255

Function: Specifies the length of the receive queue. If you set this parameter to 0, the router selects an appropriate value; otherwise, the router uses the length you specify. If you enter a value that is larger than the number of buffers the router reserves for receiving data (the compiled ring size), the router reduces the value to the compiled ring size.

Instructions: Accept the default or enter a value that is appropriate for this line.

MIB Object ID: 1.3.6.1.4.1.18.3.4.27.1.1.11

**Parameter: Control Character Mode**

Path: Configuration Manager > Select connector > **Edit Line**
Default: EBCDIC
Options: EBCDIC | ASCII
Function: Specifies the code set that the BSC protocol uses. The BSC link layers use control characters to identify frames. EBCDIC is more common than ASCII.
Instructions: Select EBCDIC or ASCII.
MIB Object ID: 1.3.6.1.4.1.18.3.4.27.1.1.12

**Parameter: External Clock Speed**

Path: Configuration Manager > Select connector > **Edit Line**
Default: 9600
Options: 1200 to 19200 bits/sec
Function: Sets the clock speed when you use an external source to supply clocking signals.
Instructions: Enter the value that most closely corresponds to the speed of the external clock, and set the Clock Source parameter to External.
MIB Object ID: 1.3.6.1.4.1.18.3.4.27.1.1.15

**Parameter: RTS Enable**

Path: Configuration Manager > Select connector > **Edit Line**
Default: Disable
Options: Enable | Disable
Function: Enables or disables the detection of request to send (RTS) and clear to send (CTS) signals on this interface.
Instructions: Set this parameter to Enable if the connected device (for example, a modem) uses RTS/CTS flow control.
MIB Object ID: 1.3.6.1.4.1.18.3.4.27.1.1.14

# Appendix C
# Default Values for BTS Parameters

Tables C-1 through C-4 list the Site Manager default parameter settings for BTS.

**Table C-1. Interface Parameters**

| Parameter | Default |
|---|---|
| Enable | Enable |
| Interface Attached To | None |
| Interface Type | Point-to-Point |
| TCP Keepalive Int(erval) | 120 seconds |
| TCP Keepalive Retry Timeout | 4 seconds |
| TCP Keepalive Retry Count | 5 |

**Table C-2. Peer Entry Parameters**

| Parameter | Default |
|---|---|
| Peer IP Address | None |
| Connection Originator | None |
| Local TCP Listen Port | None |
| Peer TCP Listen Port | None |
| Enable | Enable |

**Table C-3. Control Unit Parameters**

| Parameter | Default |
|---|---|
| Control Unit Address | None |
| Enable | Enable |

**Table C-4. Line Parameters**

| Parameter | Default |
|---|---|
| Enable | Enable |
| MTU Size | 1580 |
| Clock Source | External |
| Clock Speed | 9600 |
| Configured Transmit Q Length | 0 |
| Configured Receive Q Length | 0 |
| Control Character Mode | EBCDIC |
| RTS Enable | Disabled |
| External Clock Speed | 9600 |

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